

Serial No. 09/783,711
Amendment A

IN THE CLAIMS:

Please cancel claim 19.

Please consider the following set of pending claims 1-18 and 20-30, of which claims 1, 4, 13, 15 and 18 have been amended, and claims 20-30 are new, as attached in clean form as well as in marked-up form showing changes in the amended claims relative to the previous version of the claims according to 37 C.F.R. §1.121(c)(3):

CI an Version of Pending Claims 1-18 and 20-30

- 1 (Amended). A gas sensor comprising:
- an optical source for emitting radiation therefrom;
 - a detector sensitive to radiation emitted from the source;
 - an optical pathway extending between the source and the detector;
 - a chamber having optically reflective surfaces defining a substantially circular portion of the optical pathway and a substantially radial portion of the optical pathway; and
 - at least one reflector oriented generally at an oblique angle to the substantially circular portion of the optical pathway to separate the substantially circular portion of the optical pathway and the substantially radial portion of the optical pathway.
2. The gas sensor of claim 1 in which the chamber is defined by outer and inner circumferential walls of a substantially cylindrical housing.
3. The gas sensor of claim 2 further including a first end wall, extending radially between the outer and inner circumferential walls to define a first end of the chamber.
- 4 (Amended). The gas sensor of claim 3 further including a second end wall, extending generally radially between the outer and inner circumferential walls and at an oblique angle to a tangent of the outer or inner circumferential walls, to form the at least one reflector to reflect light through a gap in the inner circumferential wall into a central chamber.
5. The gas sensor of claim 4 in which the central chamber is defined by the internal surface of the inner circumferential wall.
6. The gas sensor of claim 3 in which the source is located adjacent said first end wall.
7. The gas sensor of claim 3 in which the detector is located adjacent said first end wall.
8. The gas sensor of claim 4 or claim 5 in which the detector is located within the central chamber.
9. The gas sensor of claim 4 or claim 5 in which the source is located within the central chamber.
10. The gas sensor of claim 2 further comprising a chamber cover, forming a closure for the cylindrical housing, the chamber cover including a reflective inner surface in combination with a gas permeable member.
11. The gas sensor of claim 10 in which the gas permeable member comprises a flame arresting material.

into 10/11 12. The gas sensor of claim 10 or claim 11 in which the gas permeable member covers an annular portion of the circumferential chamber.

13 (Amended). The gas sensor of claim 12 in which the gas permeable member comprises a disc having a radius greater than a radius of said inner circumferential wall and less than a radius of said outer circumferential wall.

14. The gas sensor of claim 4 in which the detector is located within the central chamber and comprises two detector elements spaced apart along an axis substantially parallel to the central axis of the circumferential walls.

Paul 15 (Amended). A gas sensor comprising:
an optical source for emitting radiation therefrom;
a detector sensitive to radiation emitted from the source;
a chamber, extending between the source and the detector, defined by a plurality of non-focusing, planar surfaces disposed to form a folded optical pathway that includes a plurality of segments substantially parallel to one another, each segment having at least one planar mirror surface adapted to reflect radiation to an adjacent segment at an approximately right angle.

16. The gas sensor of claim 15 further comprising a chamber cover, forming a top closure for the chamber, including a reflective inner surface in combination with a gas permeable member.

17. The gas sensor of claim 16 in which the gas permeable member comprises a flame arresting material.

18 (Amended). A method of forming a gas sensor comprising the steps of providing an optical source for emitting radiation therefrom and a detector sensitive to radiation in a bandwidth associated with an absorption spectra of a selected gas for detection emitted from the source at opposite ends of a circumferential chamber extending around the periphery of a sensor housing and having optically reflective surfaces along the length thereof, the chamber being configured to bend light in a substantially circular path.

Jul 17 20 (New). The gas sensor of claim 1 wherein the optical source emits infra red radiation.

12 21 (New). The gas sensor of claim 1 wherein the detector senses infra red radiation.

22 (New). The gas sensor of claim 1 wherein the detector is a pyroelectric detector.

23 (New). A gas sensor comprising

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an optical source for emitting radiation therefrom;
a detector sensitive to radiation emitted from the source; and
a circumferential chamber having optically reflective surfaces and extending between the source and the detector, the chamber being defined by outer and inner circumferential walls of a substantially cylindrical housing, the chamber including a first end wall, extending radially between the outer and inner circumferential walls to define a first end of the chamber, and a second end wall, extending generally radially between the outer and inner circumferential walls and at an oblique angle to a tangent of the outer or inner circumferential walls, to reflect light through a gap in the inner circumferential wall into a central chamber, the optical pathway between source and detector thereby comprising a substantially circumferential portion and a radial portion.

24 (New). The gas sensor of claim 23 in which the central chamber is defined by the internal surface of the inner circumferential wall.

25 (New). The gas sensor of claim 23 or claim 24 in which the detector is located within the central chamber.

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26 (New). The gas sensor of claim 23 or claim 24 in which the source is located within the central chamber.

27 (New). The gas sensor of claim 23 in which the detector is located within the central chamber and comprises two detector elements spaced apart along an axis substantially parallel to the central axis of the circumferential walls.

28 (New). A gas sensor comprising:

an optical source for emitting radiation therefrom;
a detector sensitive to radiation emitted from the source;
a circumferential chamber having optically reflective surfaces and extending between the source and the detector, the chamber being defined by outer and inner circumferential walls of a substantially cylindrical housing; and

a chamber cover forming a closure for the cylindrical housing, the chamber cover including a reflective inner surface in combination with a gas permeable member, the gas permeable member covering an annular portion of the circumferential chamber and comprising a disc having a radius greater than a radius of said inner circumferential wall and less than a radius of said outer circumferential wall.

29 (New). The gas sensor of claim 28 in which the gas permeable member comprises a flame arresting material.

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30 (New). A gas sensor comprising:

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an optical source for emitting radiation therefrom;

a detector sensitive to radiation emitted from the source;

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a circumferential chamber having optically reflective surfaces extending between the source and the detector, the chamber being defined by outer and inner circumferential walls of a substantially cylindrical housing; and

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a chamber cover forming a closure for the cylindrical housing, the chamber cover including a reflective inner surface in combination with a gas permeable member, the gas permeable member comprising a flame arresting material.
